Introduction

• Images are commonly used to persuade a target audience into committing or avoiding actions
• Discovery of actionable images requires knowledge about the audience
• We aim to answer the following questions:
  • Does personality play a role in explaining users’ actions in social network sites?
  • Can we identify which visual stimuli influence users with specific personality traits?
  • Can personality and image content together help predicting users’ actions in advance?

Single Trait Study

• Does trait correlate with concept c?
  Pearson correlation coefficient is computed:
  \[ \rho(t, c) = \frac{\text{cov}(Q_t, Q_c)}{\text{std}(Q_t)\text{std}(Q_c)} \]
  where:
  • \( Q_{t,u} \) is personality trait t for user u
  • \( \bar{Q}_c \) is the average concept c among u’s retweets
  • \( \rho(t, c) \in [-1, 1] \) indicate positive or negative correlation

Multiple Correlation Study

• Does concept c correlate with the five traits jointly?
  Coefficient of multiple correlation is computed:
  \[ R(c) = \frac{\sum \alpha_t c_n Q_{t,u} + \alpha_c}{\sqrt{\sum \alpha_t c_n Q_{t,u} + \alpha_c}^2} \]
  where:
  • Larger is \( R(c) \), the more c is correlated to personality
  • Coefficients \( \alpha_t c_n \) give information about single traits
  • For 1554/4342 concepts \( R(c) \) is greater than 0.3

Statistical Study

<table>
<thead>
<tr>
<th>Personality (Big Five)</th>
<th>Baselines: Logistic Regression, Factorization Machines, Personality only, Concepts only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Openness</td>
<td>CAFM</td>
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<tr>
<td>Conscientiousness</td>
<td></td>
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<tr>
<td>Extraversion</td>
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<td>Agreeableness</td>
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<td>Neuroticism</td>
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</tbody>
</table>

Example images for top positively and negatively correlated concepts

Word cloud representation of the multiple correlation study

For each trait light and dark colors indicate positive and negative correlation respectively

Action Prediction

Given user u and image i, the goal is to estimate the probability of action: \( p(\text{act}(u, i)) \)

Baselines: Logistic Regression, Factorization Machines, Personality only, Concepts only

Performance of CAFM in terms of log-loss

Performance of CAFM in terms of AUC